

What is claimed is:

- 1 1. An error correction method adding an inner parity of e bytes and an
2 outer parity of f bytes to an error correction block having a size of n bytes (in a row
3 direction) x m bytes (in a column direction), the error correction method comprising:
4 obtaining a plurality of inner parity blocks (PI blocks) by segmenting the error
5 correction block in an inner parity (PI) direction into x segments (here, x is an integer
6 equal to or greater than 2);
7 generating e-byte PI for each of the plurality of PI blocks generated by
8 segmenting, and adding the PIs in the PI direction; and
9 generating f-byte outer parity (PO) in a PO direction of the error correction
10 block having PIs, and adding the POs in the PO direction.
- 1 2. The error correction method of claim 1, wherein the PIs are Reed-
2 Solomon signs and satisfy $(n/x) + e \geq 256$.
- 1 3. The error correction method of claim 2, wherein $(n+e) \times (m+f)$ is less
2 than or equal to 64K.
- 1 4. The error correction method of claim 3, wherein n is 688 and m is 96.
- 1 5. The error correction method of claim 4, wherein x is 172 and e is 8.
- 1 6. The error correction method of claim 5, wherein f is 12.
- 1 7. The error correction method of claim 1, further comprising:
2 interleaving a plurality of data groups and the plurality of PIs in the PI direction
3 in the error correction blocks having PIs and POs.

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8. The error correction method of claim 7, wherein the interleaving further comprises:

3 gathering bytes having the same order in each of the data groups; and
4 allocating the gathered bytes sequentially according to their order.

1 9. The error correction method of claim 8, wherein the reallocating is
2 performed in the PI groups in a single data row.

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10. The error correction method of claim 7, wherein the reallocating further comprises reallocating a plurality of PIs (PI0, PI1, ..., PIn/x) by gathering bytes having a same order in bytes included in each of the plurality of PIs, thereby forming reallocated Pis groups.

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11. The error correction method of claim 10, wherein the reallocating is performed in the PIs in a single data row.

1 12. The error correction method of claim 10, further comprising:
2 moving and allocating the reallocated PIs between the reallocated PIs groups.

1 13. The error correction method of claim 11, further comprising:
2 interleaving the POs in the PO direction.

1 14. The error correction method of claim 13, wherein the PO direction
2 interleaving further comprises:
3 obtaining an $n \times f$ byte bit stream by lining up the f -byte POs sequentially, and
4 forming a divided PO by dividing the bit stream into each $\{(n \times f)/m\}$; and
5 moving and allocating the divided PO in the PO direction in each row.

15. The error correction method of claim 4, wherein $n \times m$ is a basic address unit recorded on a disk, the method further comprising:

forming a data frame with a 4-byte ID, a 2-byte IED, an 18-byte RSV, two 2-KB user data blocks, and two 4-byte EDCs.

16. The error correction method of claim 1, further comprising determining f , which is a number of PO direction parities, and x , which is a number of PI direction segments, are decided so that a result of multiplication of x with f can be divided by o , which is a number of data frames in one error correction block, without remainder, and a recording frame is formable even when f is not equal to o .

17. The error correction method of claim 16, wherein a GF (28) operation in a Galois Field can be performed.

18. The error correction method of claim 8, wherein the reallocating is performed in the PI groups in a plurality of data rows.

19. An error correction method directed to an error correction block having data an inner parity direction and an outer parity direction, comprising:
segmenting the error correction block in the inner parity direction to form a plurality of inner parity segments.

20. The error correction method of claim 19, further comprising:
generating an e -byte inner parity for each of the plurality of inner parity segments; and
adding the e -byte inner parities to form a plurality of inner parity blocks.

21. The error correction method of claim 20, further comprising:
generating an f -byte outer parity; and

3 adding the f-byte outer parities in the outer parity direction.

1 22. The error correction method of claim 21, further comprising adding the
2 e-byte inner parities to the inner parity segments in the inner parity direction.

1 23. The error correction method of claim 22, further comprising interleaving
2 the data after adding the e-byte parities to the inner parity segments.

1 24. The error correction method of claim 23, wherein the interleaving of the
2 data comprises interleaving in the inner parity direction.

1 25. The error correction method of claim 24, wherein the interleaving of the
2 data in the inner parity direction comprises interleaving the data within the inner parity
3 blocks.

1 26. The error correction method of claim 25, wherein the interleaving of the
2 data in the inner parity direction comprises interleaving four inner parity blocks one by
3 one in a predetermined turn.

1 27. The error correction method of claim 26, wherein the interleaving of the
2 data comprises interleaving the data in the outer parity direction.

1 ~~28.~~ The error correction method of claim 27, wherein the interleaving of the
2 data comprises interleaving a quantity of the data in relation to the size of a burst error.

1 29. An optical disk comprising:
2 an error correction block, comprising:
3 a plurality of inner parity blocks, each said inner parity block comprising
4 an e-byte inner parity in an inner parity direction; and

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a plurality of f-byte outer parities in an outer parity direction.

- 1 30. The optical disk of claim 29, further comprising a plurality of data
2 groups interleaved with the inner parity blocks.

- 1 *Sub C14* 31. The optical disk of claim 30, wherein the plurality of f-byte outer parities
2 are interleaved in the outer parity direction.

- 1 32. The optical disk of claim 31, wherein the optical disk is a digital
2 versatile disk (DVD). *B*

- 1 33. The optical disk of claim 32, wherein the digital versatile disk is a high
2 density digital versatile disk (HD-DVD).

- 1 *Sub C17* 34. The optical disk of claim 33, wherein the high density digital versatile
2 disk has a storage capacity of at least 15 GB. *add 35*